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A MORPHOLOGICAL DISTINCTION BETWEEN THE LARVAE OF *CHEUMATOPSYCHE CAMPYLA* AND *C. PETTITI* (TRICHOPTERA: HYDROPSYCHIDAE)

Thirty-nine Nearctic species of the caddisfly genus *Cheumatopsyche* Wallengran have been described, illustrated, and keyed (Gordon, 1974). Most *Cheumatopsyche* larvae are distinctive in having a median notch on the anterior margin of the frontoclypeal apotome (a median cephalic sclerite) (Wiggins, 1977). Although adult–larval associations have been made for several species, characters distinguishing larvae have been difficult to find (Ross, 1944; Wiggins, 1977).

Of the two species used in this study, *C. campyla* larvae prefer larger rivers, seldom inhabiting small streams (Ross, 1944). This species is most abundant through the Corn Belt states but is found over most other parts of the continent as well. *Cheumatopsyche pettiti* (=*analis* Banks, sensu Ross, 1944) show a preference for small streams but also occur in larger rivers (Ross, 1944). This species exhibits a wide geographical distribution, from the Atlantic to the Pacific through the northern states, and south to Oklahoma and Georgia.

Described below is a qualitative morphological distinction between the larvae of *C. campyla* and *C. pettiti.* This distinction is based on the comparative examination of 40 associated specimens of *C. campyla* and 21 associated specimens of *C. pettiti.* As supporting evidence, comparisions were also made with associated specimens from the scientific collection of the Illinois Natural History Survey.

MATERIALS AND METHODS

From May through August 1978, and April through June 1979, weekly field collections of caddisfly larvae and pupae were made by handpicking rocks in riffle areas at two locations; Horse Creek, 0.8 miles from its confluence with the Kankakee River near Custer Park, Illinois, and the Kankakee River between Custer Park and Resthaven, 0.1 miles downstream from the mouth of Horse Creek. The pupae were placed in 3-dram vials which were approximately half-filled with stream water and then placed on ice for transport to the laboratory for rearing (Smith, 1984). The larvae were preserved in 70% ethyl alcohol (EtOH) for later study.

Laboratory-reared adults were identified and preserved in 70% EtOH with their pupal cases, which contained the hard parts of their larval exuvia. The "metamorphotype method" of identification (Milne, 1938) was employed for those pupae which did not emerge. With this procedure, associations between larva, pupa, and adult can be made by using the imaginal genitalia for adult species identification, and removing the larval sclerites from the case for identification of the larva. However, most of the non-emerging pupae in this study were not mature enough for species determination. Of those pupae which were identified, the larval sclerites and mandibles were slide mounted in polyvinyl lactophenol and examined.

The following larval characters were compared:

1. The number of teeth on the left and right mandibles. A "mandibular formula"

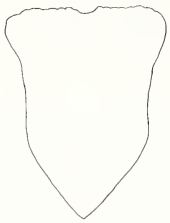


Figure 1

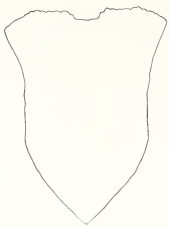
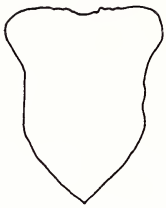
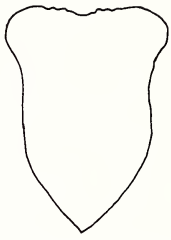


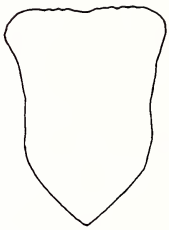
Figure 2



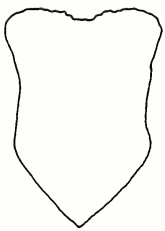
a.



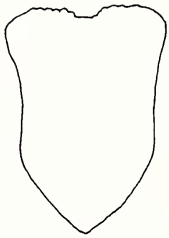
b.



c.



d.



e.

Figure 3

Figs. 1–3. 1. Frontoclypeal apotome of *Cheumatopsyche pettiti* showing the shape of the notch on the anterior margin. 2. Frontoclypeal apotome of *Cheumatopsyche campyla* showing the shape of the notch on the anterior margin. 3. Frontoclypeal apotome of specimens from the scientific collection of the Illinois Natural History Survey showing the difference in the

was used in making this comparison: (number of teeth on outer margin of mandible) + (number of teeth on inner margin of mandible) (e.g., 2 + 6).
2. Presence, or absence, and relative length and position of mandibular brushes.
3. Setal arrangement on setal areas 1, 2, and 3 (SA1, SA2, and SA3) (Wiggins, 1977), on the meso- and metathoracic sclerites.
4. Presence or absence of setae and setal patterns on the head capsule.
5. Length/width ratio of the frontoclypeal apotome. The length was taken to be the distance from the base of the median notch on the anterior margin of the frontoclypeus to the posterior tip of the apotome. The distance between the parallel sides of the apotome was taken as the width.
6. Bristle patterns on the frontoclypeal apotome (Krafka, 1923).
7. Structural comparison of the shape of the anterior notch on the frontoclypeal apotome.

The length/width measurements were taken with an ocular micrometer at 63×, all other characters were examined at 63× and 160×.

The only morphological distinction observed between the larvae of *C. campyla* and *C. pettiti* was a difference in the shape of the notch on the anterior margin of the frontoclypeal apotome. The other six characters examined gave no information useful in distinguishing between the larvae of these two species. Based on results from 21 associated specimens, the anterior notch of *C. pettiti* was found to be a shallow, crescent-shaped depression (Fig. 1). In contrast, the notch on all of the 40 associated specimens of *C. campyla* was larger and deeper, the lateral margins were more angled, and the base of the depression was straight (Fig. 2). This character difference was found to be consistent for all of the reared specimens during this study, and also for the associated museum specimens which were examined (Fig. 3). The fact that the museum specimens were collected from a wide range of geographical locations lends further support to this character.

The *Cheumatopsyche* spp. larvae which were collected and preserved were also compared. By using the above described character, as a general observation, it was possible to separate the larvae as to the site where they had been collected, Horse Creek or the Kankakee River. These results coincided with the distinction observed between the associated specimens and with the locations where the associated specimens were collected. Thirty-nine of the associated specimens of *C. campyla* were collected from the Kankakee River location, and one was collected from Horse Creek. Of the 21 associations made for *C. pettiti,* 19 were collected from Horse Creek and two were taken from the Kankakee River.

The median notch on the anterior margin of the frontoclypeal apotome could be an important character in further studies involving the larval taxonomy of the genus *Cheumatopsyche,* although there is no doubt that variations within a population do

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shape of the anterior notch. a. *C. pettiti,* Burton Creek, Quincy, Illinois, 1940. b. *C. pettiti,* Piney Grove, Maryland, 1938. c. *C. pettiti,* South River, Palmyra, Missouri, 1938. d. *C. campyla,* Devils River, Devils River, Texas, 1939. e. *C. campyla,* Indian Creek, Serena, Illinois, 1938.

exist. Due to the qualitative nature of this distinguishing feature, it is suggested that it be used only as a supporting character, providing one or more additional, possibly quantitative, characters can be found.

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